Traffic Impact Analysis Review

Purchase Order #: 190806-00
Contract Name: City of Deltona Transportation and Planning Services – RFP No. 14012
Subject #: Review of Traffic Impact Analysis – Project RZ19—0001 (Industrial Warehouse)
Date: August 8, 2019

BCC Engineering has performed a review of the *Traffic Impact Analysis for the Industrial Warehouse dated July 2019*. We offer the following comments for consideration:

Traffic Study Comments:

1) The document should be signed and sealed by a Florida P.E.
2) In the executive summary, the location for the proposed warehouse was mentioned on the east side of Normandy Boulevard, but it is actually on the west side of Normandy Boulevard, please revise.
3) The executive summary states that the number of proposed connections to/from the warehouse as four (4) full access connections. The third paragraph from the introduction section identifies three full access connections, and the methodology states there are two access connections. The site plan in Appendix B shows four (4) access connections as mentioned in the executive summary. The document should be reviewed and revised for consistency, as appropriate.
4) Is it reasonable to consider 1.1 million Square Feet (SF) will be constructed by 2020? This directly affects the background traffic growth. While Florida Growth Management law does not require developers to pay for backlogged facility improvements, it is not clear whether the applicant should be assessed a fair share of the background improvements if they create a surplus in capacity that the development utilizes and relies upon. A longer build out period would naturally increase the background growth and use up capacity from the background improvements. A reasonable horizon year should be used.
5) It would be helpful to include a site plan figure in the body of the report similar to the one shown in the methodology.
6) There should be a description/discussion of the proposed use(s). Warehouse is mentioned; however, the site plan seems to reflect more than simply warehouse – see notes included on site plan. Based on the anticipated use(s), perhaps ITE's Warehouse Land Use is not the appropriate land use to compare with. A discussion of the proposed use would help address this.
7) In the project trip generation section, a reference is made to the end user data provided in the appendix that estimates 2,596 daily net new external trips with 577 AM peak-hour trips and 1,043 PM peak-hour trips (this was included in the methodology on a count summary titled Non-Sortable FC – Peak Season. An explanation/discussion should be included in this section of how this data was generated. Is this an average of multiple days of data, multiple sites, and what was/were the scale of the source sites? Trip generation is typically based on a trip rate from a similar use and should be based on the scale and type of use. For example, the site plan identifies 1.1 million SF of warehouse, but it also notes a mezzanine area (approximately 320,000 SF). This would increase the trip generation as depicted in the conceptual site plan depending on how that area will be used. Did the source sites have a similar use?

8) The trip distribution percentages were reviewed from the methodology and Figure 1. It is unclear how the vehicles were distributed at the interchanges of I-4 with SR-472 and I-4 with Saxon Boulevard. Insets of these areas should be provided so that the percentage distribution through these areas can be verified.
9) For roadway segment analysis, the references materials mentioned in Tables 2 and 3 of the 2018 Volusia County Annual Average Daily Traffic & Historical Counts Report and the tables used to determine Level of Service (LOS) from the 2013 FDOT Quality/LOS Handbook should be included in the appendices.
10) In Table 2, an extra column for 'Two-Way Peak Hour Volumes' should be added similar to Table 3.
11) In Tables 2 and 3, the peak-hour two-way service volume for Main Street (Lake Helen) from I-4 to Lakeview Drive should be 470 instead of 950 as reported in the table. Also, in Table 2, Note 4 pertains to PM peak, please explain why that is included in Table 2, or move to Table 3 if appropriate.
12) Table 3 (Existing Two-Way PM Peak Hour Volumes) the directional volumes are 50/50. Is that accurate? If not, a note should be added to explain why this is so. Also, note 3 states that the volumes are based on 2018 Volusia County AADT Report. Why was existing data not based on existing turning movement counts similar to the AM volumes in Table 2? Were the PM 2020 Peak Season volumes for future background conditions based on these also?
13) It was mentioned on page 3 of the report that Orange Camp Road from US 17/92 to I-4 will be analyzed as part of this TIA. Tables 2 and 3 only include the segment between Blue Lake Avenue and I-4. Should the analysis also include the segment between US 17/92 and Blue Lake Avenue?
14) The intersections listed on page 4 of the report mention Normandy Boulevard and Project Access Locations (3). There should be 4 access locations instead.
15) In the roadway segment analysis section (page 8 of the report) the roadway segments are listed that do not meet the adopted LOS standard.
    a) The segments depicted are only for the PM peak hour. The roadway segment on Main Street between I-4 and Lake Drive operates at LOS 'D' versus the adopted LOS of 'C' and should be added to the list of segments.
    b) The segment of I-4 from Seminole County Line to SR 472 should be Interstate 4 from Seminole County Line to Saxon Boulevard.
16) The description in the second paragraph of the Intersection Analysis section states that, "Additionally, several intersections are shown to operate with individual traffic movements having a volume to capacity (V/C) ratio exceeding 1.0, as summarized in Table 4." It would be helpful to include the associated movement next the v/c ratio in the 'max movement v/c' column (e.g., 0.85 (EBR)). This will help to assess whether the proposed project impacts the critical movements.
17) In Table 4, intersection 24 (I-4 EB Ramp and Saxon Blvd), intersection delays for the AM and PM peak hours were reported as 12.5 and 104.9 seconds, respectively. They should be 15.9 and 108.2 seconds as shown in the HCM 2000 output in the appendix. This should be revised.
18) In the Committed Transportation Improvements section, it is not clear why the 2040 LRTP improvements are introduced. These were not mentioned in the methodology and they are not funded or committed improvements. An explanation of how these were used in the analysis should be included or they should be removed.
19) Synchro PM Peak Hour Existing Volumes: Intersection 7 (Kentucky Avenue & Graves Avenue), minor discrepancies in volumes were found between Figure 5 and the Synchro sheet. This should be corrected.

20) In the Traffic Volume Development section (page 14 of the report), it is stated that, "As to not double count 2020 future background traffic, a 50% reduction was applied to the future background growth to calculate future traffic volumes." This was not agreed upon in the methodology. Further, it is not clear how this was applied. This does not seem appropriate for this area and the time frame proposed for the development buildout. This should be explained further, and an example of how it is to be used should be included so that its implementation can be verified.
21) The second paragraph in the "Future Buildout Roadway Segment Analysis" section describes that there are three additional roadway segments that will exceed the adopted LOS due to project. Based on the information provided, this should be 6.
    a) Two segments related to the PM peak hour were mentioned in the bullet points. The additional segment of Elkcam Boulevard between Normandy Boulevard and Fort Smith Boulevard also fails in the future buildout conditions and should be included. A statement is made that both of the roadway segments are noted in the River to Sea TPO 2040 LRTP as requiring increased capacity to support future traffic projections within the area but are not funded for construction within the next three years. As such, these capacity improvements cannot be relied upon as committed. The potential additional traffic from warehouse is projected to increase the v/c ratio from 0.97 to 1.08 on Kentucky Avenue between SR 472 and Graves Avenue and v/c ratio of 0.99 to 1.07 on Elkcam Boulevard between Normandy Boulevard and Fort Smith Boulevard. Mitigation measures need to be included to address these deficiencies.
    b) Why were the failing roadway segments in the AM peak not discussed or explained in the report? For example, the LOS for the segment of Saxon Boulevard between FDOT Park & Ride and I-4 goes from 'E' to 'F' with an increase in v/c ratio. Also, segments on Howland Boulevard between I-4 and Catalina Boulevard were projected to go from LOS 'D' to 'F' in the future background conditions. These should be addressed in this section.
22) In Table 5,
    a) Headers say, "PM Peak Hour Project Traffic" and "Future Buildout PM Peak Hour Traffic Conditions". Please revise PM to AM.
    b) On Normandy Boulevard between Graves Avenue and the Project Access Location, and from the Project Access Location to Rhode Island Avenue, the distribution was reported as 48% (north) and 41% (south), respectively. Figure 1 depicts those percentages as 56% and 44%, respectively. Why are these percentages different? This affects the reported project impact on these links. This comment is also applicable to Table 6.
23) In Table 7, intersection 24 (I-4 EB Ramp and Saxon Boulevard), intersection delays for the AM peak hour without and with improvements were reported as 20.3 and 17.2 seconds, respectively. They should be 24.7 and 22.6 seconds based on the HCM 2000 output in the appendix. Please revise.
24) In Table 7, Intersection 2 (Kentucky Avenue and SR 472): The sentence ends with word "additional", please finish the sentence with the other proposed improvements.
25) In Tables 7 and 8 (future background conditions):
    a) It is not clear what triggers when an improvement is needed. Is it based on LOS of 'E' or 'F' or is it based on v/c ratio greater than 1.0? Also, if an improvement is made in the AM was it carried through to the PM. In at least one case there was a LOS 'E' and no improvements were recommended.

b) For the intersection of Howland Boulevard and Graves Avenue, extra left-turn lanes were proposed on all the movements. Based on the volumes for the SBL movement (75 vph in the AM and 62 vph in the PM), two left-turn lanes seem excessive. How were the improvements for background conditions identified? If extra improvements are provided for background, then the project traffic will not pay its fair share of those improvements.

26) In Table 8,
   a) Intersection 24 (I-4 EB Ramp and Saxon Boulevard), intersection delays for the PM peak hour without and with improvements were reported as 104.9 and 33.2 seconds, respectively. They should be 152.1 and 34.3 seconds based on the HCM 2000 output in the appendix. Please revise.
   b) Intersection 25 (Normandy Boulevard and Saxon Boulevard), intersection delay for the PM peak hour with improvement was reported as 58.9 seconds, it should be 60.9 seconds based on the HCM 2000 output in the appendix. Please revise.

27) In Table 9,
   a) Intersection 24 (I-4 EB Ramp and Saxon Boulevard), the intersection delay for the AM peak hour was reported as 17.7 seconds, it should be 22.4 seconds instead. Please revise.
   b) Intersection 9 (Howland Boulevard and Graves Avenue), the intersection delay for the AM peak hour with improvements was reported as 70.3 seconds with LOS 'E' and v/c ratio of 1.03, it should be 50.7 seconds with LOS 'D' and v/c ratio of 1.05 instead. Please revise and explain how the higher v/c ratio with improvements is better than without improvements.
   c) Intersection 28 (Normandy Boulevard and Driveway 1) should be taken out from the signalized intersections section. Also, intersection 31 (Normandy Boulevard and Driveway 4) should be moved to the unsignalized intersections section in the same table.

28) In Table 10,
   a) Intersection 15 (Normandy Boulevard and Elkcam Boulevard), the intersection delay for the PM peak hour was reported as 15.8 seconds with LOS 'B'. It should be 21.7 seconds with LOS 'C' instead.
   b) Intersection 24 (I-4 EB Ramp and Saxon Boulevard), the intersection delay for the PM peak hour was reported as 33.1 seconds, it should be 35 seconds instead. Please revise.
   c) Intersection 25 (Normandy Boulevard and Saxon Boulevard), the intersection delay for the PM peak hour without improvements was reported as 71.4 seconds. It should be 73 seconds instead. Please revise.
   d) Intersection 28 (Normandy Boulevard and Driveway 1) should be taken out from the signalized intersections section. Also, intersection 31 (Normandy Boulevard and Driveway 4) should be moved to the unsignalized intersections section in the same table. Please revise.

29) In Table 10, intersections 12 and 14 have movements operating at v/c ratios of 1.02 and 1.00, respectively. No improvements were recommended. Please explain.

30) In Table 11,
    a) At the intersection of SR 472 and N Kentucky Avenue, the required additional total turn lane length for the proposed additional southbound left-turn should be 525 – 350 = 175 feet.
    b) At the intersection of Graves Avenue and Kentucky Avenue, the required total turn lane length for the proposed additional southbound left-turn lane should be 510 – 320 = 190 feet.
    c) At the intersection of Graves Avenue and Normandy Boulevard, the required total turn lane length for the proposed additional westbound left-turn lane should be 435 – 400 = 35 feet.
    d) At the intersection of Graves Avenue and Howland Boulevard, the required total turn lane length for the proposed additional northbound left-turn lane should be 670 – 280 = 390 feet and for the proposed additional eastbound left-turn lane should be 390 – 330 = 60 feet.
31) The description in the site access analysis states that the access to the property is proposed via three proposed full access connections (one for truck traffic and two for all other vehicles entering/exiting the warehouse). It should be four access connections instead with one access for trucks and three others for all other vehicles. Please revise the description.
32) The Recommended Intersection Mitigation Figure on page 30 is labeled as Figure 5 but should be Figure 9. Please revise. Also, add the proposed geometry at the new driveways from the site (intersection numbers 28 through 31).
33) Site analysis section, Normandy Boulevard at Driveway 1: The description in the last sentence has to be changed since the northbound left turn was proposed.
34) In the preliminary signal warrant analysis section:
    a) It was observed that for driveways 3 and 4, the northbound left-turn lane into the driveway was considered as the minor street instead of the driveways. This is not consistent with application of the Signal Warrant analysis procedure in the MUTCD. Please revise the analysis as appropriate.
    b) For the intersection of Normandy Boulevard at Driveway 4, it is stated that, "the projected PM peak-hour traffic volumes at buildout meet peak hour signal warrant criterion for signalization at the intersection." This is not the case. The volumes do not meet the peak-hour volume warrant. Please reconcile.
    c) The MUTCD notes that improper or unjustified traffic control signals can result in a significant increase in the frequency of rear-end collisions. Traffic control signals were proposed at driveways 2 and 3 in the report. Since exclusive right-turn lanes are provided at driveways 2, 3 and 4, right-turn volumes can be discounted in the warrant analysis. Application of MUTCD warrant analysis would suggest that only driveway 2 would meet the warrant criteria for the peak-hour warrant. Further, if a traffic signal is constructed as part of the project based on projected volumes, paragraph 11 (Section 4C.01) of the MUTCD proffers the following guidance: "*a traffic control signal installed under projected conditions should have an engineering study done within 1 year of putting the signal into stop-and-go operation to determine if the signal is justified. If not justified, the signal should be taken out of stop-and-go operation or removed*."
35) In the alternative mode analysis section, the study indicates that buses will enter driveway 2 and exit driveway 3 to pick-up and drop off people. This needs to be verified with the transit provider since they may not want to travel off-route to make this stop. If the transit provider does not commit to this, proper connections should be provided from the site to the nearest approved transit stop along Normandy Boulevard.

36) It was stated in the "Required Transportation Improvements" section of the methodology that 'proportionate shares will be included within the traffic study and calculated per Florida Statutes HB 319 adopted May 30, 2013.' This information was not provided in the body of the report.
37) The conceptual site plan in Appendix B notes that permissible uses include sale of products, materials and merchandise including liquor and grocery/food items of all types, in addition to storage and distribution (normal warehouse). This was not mentioned in the methodology. The City should confirm that they agree with the stated permissible uses on the conceptual site plan since these additional uses would affect the trip generation and the appropriate ITE Land Use Category.
38) The main area plus office area which is 1,043,110 SF + 51,785 SF = 1,094,895 SF instead of 1,094,865 SF as shown in the site plan.
39) The site plan should include the calculations for the proposed number of parking spots as provided in the overall site data (point 5) for the warehouse.
40) Appendix E (Intersection Volume Development Worksheets):
    a) None of the intersection volume development sheets for 2020 Peak Season traffic could be verified. The methodology indicates that 2020 volumes should be equal the 2019 Peak Season Volumes * Growth Factor, please explain. This will affect the future background and project traffic which has to be revised.
    b) Please describe how the vested trips were calculated in the volume development sheets? How were these trips distributed at the intersections?
41) For the SYNCHRO analyses, at the intersection of S Kentucky Avenue & Graves Avenue, the eastbound left-turn movement was coded as protected phase, but it is permissive + protected phasing based on the signal timing sheet. The analysis should be revised, and the report updated accordingly.
42) For the SYNCHRO analyses, the volumes coded in the 2020 PM Peak Future background conditions, there were numerous intersections that used volumes inconsistent with the volume development sheets (and Figure 5). Examples include the following intersections: Dr. MLK Junior Beltway at Orange Camp Road, N Kentucky Avenue at SR 472, Howland Boulevard at Graves Avenue, Veterans Memorial Parkway at Graves Avenue, Catalina Boulevard at Howland Boulevard. Please review each location and revise, as necessary.
43) The 2020 PM Peak Buildout condition at the intersection of Normandy Boulevard and Driveway 3 identifies that the eastbound approach of the driveway fails, even under signalization. Please explain why further improvements were not recommended (e.g. further signal optimization).